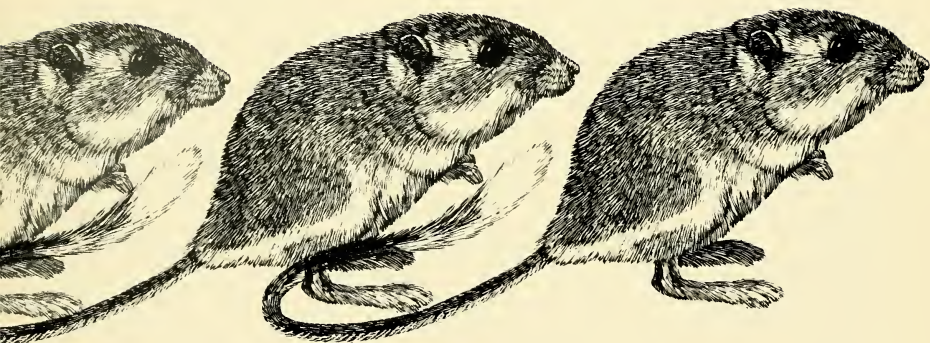




**AN ANNOTATED LIST OF THE MAMMALS
OF SAN DIEGO COUNTY, CALIFORNIA**

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TRANSACTIONS

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An annotated list of the mammals of San Diego County, California

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In 1921, Frank M. Stephens, veteran San Diego naturalist and Curator at the Natural History Museum, published the first list of the mammals of San Diego County. He cited 65 species of land mammals (plus additional subspecies), and gave brief descriptions of their range and habitat. In the intervening five decades, much new information has become available as local scientists, including L. M. Huey and R. C. Banks, former Curators at the Natural History Museum, continued detailed studies of the local fauna. Unfortunately, there is no recent compilation of this information, and Stephen's paper has long since been out of print, so that local students have had little to guide them.

In this paper I have attempted to summarize current knowledge of the status and habitat preferences of each species, and to give details on scientific reference material in the San Diego Natural History Museum and other major western collections. I recognize 80 species (plus many more subspecies) as occurring in the county. The increase is due to the introduction of several species, the occurrence of natural vagrants (mainly migratory bats), and taxonomic changes. There is no up-to-date compilation of marine mammals that occur along the county coastline. For general information in California see Daugherty, 1972, *Marine Mammals of California*.

Scientific and common names in this paper are those used by Jones, Carter and Genoway's (1973) *Checklist of North American Mammals North of Mexico*, except where noted. Species are included here on the basis of specimens examined or from literature references. Localities are arranged alphabetically. "San Diego area" includes the area north to La Jolla, east to Santee-Lakeside-El Cajon, and south to and including Chula Vista. Locality names are those used on current maps and the spelling may differ slightly from that on the collected specimens. For example, Mountain Springs was formerly known as Mountain Spring.

Life-zones listed are after J. Grinnell (1933). Life-zones, theoretically, are areas characterized by distinct assemblages of plants and animals (across North America from south to north, or from low to high). Three zones occur in San Diego County, as shown in Figure 1. One of the easiest ways to recognize life-zones is to learn the plants that typify them. In the Lower Sonoran Zone one finds desert plants such as cacti, agave, mesquite, creosote bush, yucca, arrowweed, and so forth. In the Upper Sonoran Zone, chamise, scrub oak, flat-top buckwheat, and chaparral plants predominate. The Transition Zone, at higher elevations, includes pines, firs, and cedars. Some species of mammals are restricted to certain zones and habitat types, whereas others are widespread.

I wish to thank the following for allowing me to examine catalogs and (or) specimens in their care: L. C. Binford, California Academy of Sciences (CAS); D. R. Patton, Los Angeles County Museum of Natural History (LACM); M. Getty, Anza Borrego Desert State Park (ABDSP); and W. Z. Lidicker, Jr., Museum of Vertebrate Zoology (MVZ). Gail Culver prepared the map. Ross Dingman added comments and several site records. For permission to reproduce the cover and text illustrations of Sheridan Oman, I thank Richard C. and Sharon Nelson, Tecolote Press, Inc. of Glenwood, New Mexico.

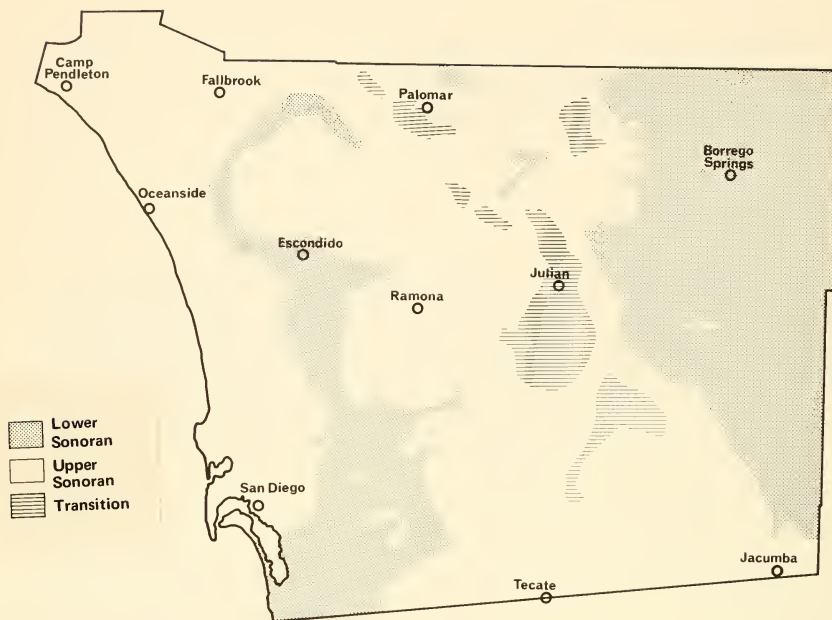


Figure 1. Life-zones of San Diego County (from Higgins, 1949, San Diego Soc. Nat. Hist., Occ. Paper 8).

SPECIES ACCOUNTS

Order Marsupialia

Family Didelphidae (Opossums)

• *Didelphis virginiana*

An introduced species first captured wild in California in 1914 near Agnew, Santa Clara Co. (J. Grinnell, 1915: 114), and first taken in the county in La Puerta Valley in 1926 (Bryant, 1927: 146). Opossums are omnivorous and are most often found in coastal drainage areas near human habitation where they often act as scavengers. Now rather common. SDNHM specimens: La Puerta Valley, San Diego area.

• Opossum

Order Insectivora

Family Soricidae (Shrews)

• *Sorex ornatus ornatus*

Most abundant in the Upper Sonoran life-zone but found from the coast to the mountains. Usually in damp earth on slopes and sometimes in dry areas beneath chaparral. Uncommon. SDNHM specimens: Kearny Mesa, Julian, San Diego area. Stephens (1906: 252) reported finding two dead near Santa Ysabel. Other specimens (MVZ): Dulzura.

• Ornate Shrew

- *Notisorex crawfordi crawfordi*

- Desert Gray Shrew

Found mainly in the Lower Sonoran life-zone although not restricted to any particular habitat. Uncommon. SDNHM specimens: Borrego Palm Canyon, Encinitas, Escondido, San Diego area. Other specimens (MVZ): Bernardo, Santa Ysabel, Vallecito. New trapping techniques with better results indicate that shrews may not be as rare as previously thought.

Family Talpidae (Moles)

- *Scapanus latimanus occultus*

- Broad-footed Mole

Found mainly in the Upper Sonoran life-zone. The main limitation to its range seems to be sufficient soil moisture (Palmer, 1937: 281). Most common in the mountains. SDNHM specimens: Alpine, Ballena, Escondido, Jamacha, Julian, Ramona, Tecate. Other specimens (MVZ): Warner Pass, Witch Creek.

Order Chiroptera

Family Phyllostomatidae (Leaf-nosed Bats)

- *Macrotus waterhousii californicus*

- California Leaf-nosed Bat

Found in the Lower Sonoran life-zone. This colonial species lives in caves or other protected areas and is seen only on the wing after twilight (Banks, 1965: 13). It probably hibernates during the colder months. SDNHM specimens: Anza Borrego Desert State Park area, Dulzura, Pauma Valley, Vallecito. H. Grinnell (1918: 255) reported them at De Luz and the Santa Margarita Ranch and River.

- *Choeronycteris mexicana*

- Long-tongued Bat

Found usually in the Sonoran life-zone (Ingles, 1965: 117). This nectar-feeding bat is apparently a fall vagrant from Central Mexico. It was first recorded from the county in September 1946 (Olson, 1947: 183). Many subsequent records were obtained in October 1947 and 1963 and December 1947. SDNHM specimens: (39) all San Diego area.

Family Vespertilionidae (Evening Bats)

- *Myotis lucifugus*

- Little Brown Myotis

Never before recorded from southern California, this vagrant is listed here on the basis of a single specimen taken at Lake Hodges Dam in 1943 (LACM #8081). Found generally in forested areas, its southern limit is the San Bernardino Mountains (Miller and Allen, 1928: 51).

- *Myotis yumanensis sociabilis*

- Yuma Myotis

Found chiefly in the Upper Sonoran life-zone west of the desert but east of the humid coastal belt in areas of oaks and pines or broken chaparral. SDNHM specimens: Barret Dam, El Monte Park, Lake Hodges. Other specimens (MVZ): Doane Valley, 4 mi. E Laguna Junction, San Diego area, Warner Springs. Miller and Allen (1928: 69) also reported it from San Luis Rey.

- *Myotis evotis evotis*

- Long-eared Myotis

A solitary bat found chiefly in the Transition and Upper Sonoran life-zones. Stephens (1921: 52) reported, "found throughout the county. Not common." There are no specimens in the collection, although they have been reported from Witch Creek (H. Grinnell, 1918: 294) and Dulzura and Twin Oaks (Miller and Allen, 1928: 117). Other specimens: Palomar Mountain (CAS); Doane Valley, Cuyamaca State Park (MVZ). Our catalog lists specimens from: Laguna Mountain (1059), Ballena (81), Witch Creek (82); all are missing.

- *Myotis thysanodes thysanodes*

- Fringed Myotis

Said to be found in the Upper Sonoran life-zone in areas of heavy chaparral or

mixed forest and chaparral (J. Grinnell, 1933: 88). SDNHM specimens: Pine Valley (one). Other specimens (MVZ): Doane Valley, Laguna Junction. Miller (1897: 80) reported them at Dulzura.

- *Myotis volans interior*

Found in the Upper Sonoran to Transitional life-zones, Stephens (1921: 52) stated, "Generally distributed but not common in the coast region." SDNHM specimens: Julian (two). Other specimens (MVZ): Cuyamaca Mountains. Also reported from Dulzura (Miller and Allen, 1928: 143).

- Long-legged *Myotis*

- *Myotis californicus californicus*

Found in the Transition and Upper Sonoran life-zones in wooded canyons or chaparral slopes along the Pacific coast region west of the mountains. SDNHM specimens: Ballena, Lake Henshaw, La Puerta Valley, Palomar Mountains, San Diego, Witch Creek. Other specimens (MVZ): Cuyamaca, Descanso, Julian area, Hubbard's Grove, Pala, Warner Springs. Another race, *M. c. stephensi*, is found in the Lower Sonoran life-zone in the desert region east of the mountains. SDNHM specimens: Anza Borrego Desert State Park area.

- California *Myotis*

- *Myotis leibii melanorhinus*

A non-colonial species found in the Upper Sonoran and Transition life-zones among trees in semiarid areas. Fairly common. SDNHM specimens: Grapevine Canyon, Oriflamme Canyon, Pine Valley, San Diego, Santa Ysabel, and surprisingly Borrego Springs. Other specimens (MVZ): Boulder Oaks, Cuyamaca Rancho State Park, Julian, Laguna Junction, Manzanita, McCain Valley, near Vallecito (see Banks, 1965: 16), Wynola. Other localities: Dulzura, Jacumba, Santa Ysabel (H. Grinnell, 1918: 292); Twin Oaks, Witch Creek (Miller and Allen, 1928: 170).

- Small-footed *Myotis*

- *Lasionycteris noctivagans*

Never recorded in southern California prior to 1973, when one was collected in a mist net at Agua Caliente Springs in February 1973 (specimen SDNHM). Subsequently, two others have been banded in the winter (T. McDonnell, pers. com.). Normally confined to the Transition life-zone, its former southern limit was Pacific Grove, Monterey Co. (H. Grinnell, 1918: 302).

- Silver-haired Bat

- *Pipistrellus hesperus*

This is the smallest and most common of our bats. It is solitary and usually first seen at early dusk. The desert race, *P. h. hesperus*, is found mainly in the Lower Sonoran life-zone east of the Pacific divide. SDNHM specimens: Borrego Desert area. Also reported from: Dulzura and Santa Ysabel (H. Grinnell, 1918: 310). The coastal race, *P. h. merriami*, is found in the Upper Sonoran life-zone west of the Pacific divide. SDNHM specimens: De Luz, San Diego, San Marcos, Suncrest. Other localities (H. Grinnell, 1918: 312): Escondido, Twin Oaks, Witch Creek. H. Grinnell (p. 310) stated, "Specimens from Witch Creek (or Santa Ysabel), San Diego County, are allocated with difficulty, some appearing to be nearest *hesperus* and others nearest *merriami*."

- Western *Pipistrelle*

- *Eptesicus fuscus pallidus*

This bat is said to occur chiefly in the Upper Sonoran and Transition life-zones, although Krutzsch (1946: 240) reports them, "taken from all life-zones in San Diego County." There are no winter specimens, and Krutzsch considered them migratory. SDNHM specimens: Alpine, Ballena, Barrett Junction, Dehesa, Escondido, Julian, Potrero, Witch Creek; MVZ specimens: Campo, Cuyamaca Mountains, Deluz, Descanso, Doane Valley, El Monte Oaks, Fallbrook, Foster, Jamacha, Lakeside,

- Big Brown Bat

San Onofre, Santee; ABDSP specimens: Pinyon Mountain Valley. Other localities: San Felipe Canyon, Agua Caliente Hot Springs and Vallecito Stage Station (Banks, 1965: 20).

• *Lasiurus borealis teliotus*

• Red Bat

A solitary, tree-dwelling bat found west of the desert divide in the winter and spring. The sexes seem to separate during the summer with the females in the Lower Sonoran life-zone and the males in the Upper Sonoran (H. Grinnell, 1918: 326). SDNHM specimens: San Diego area, San Onofre, San Ysidro, Witch Creek. Other specimens: Escondido (MVZ); Santa Ysabel (H. Grinnell, 1918: 329).

• *Lasiurus cinereus cinereus*

• Hoary Bat

Also a solitary, tree-dwelling, migratory bat found in the valleys during the winter. SDNHM specimens: Del Mar, Jamacha, Jamul, Rancho Santa Fe, San Diego area. Other specimens (MVZ): Bonsall, San Marcos, San Pasqual. Also reported from Santa Ysabel (H. Grinnell, 1918: 329).

• *Lasiurus ega xanthinus*

• Southern Yellow Bat

A vagrant from southern Mexico that was first recorded from the county in June 1967 (Bond, 1970: 115). The six specimens in the collection are from Borrego Springs.

• *Euderma maculatum*

• Spotted Bat

Vagrant. This bat is reported from the county on the basis of one specimen taken at the University of San Diego and now in their collection (August and Dingman, 1973: 166). Miller and Stebbins (1964: 283) report, "The natural history of this rare bat is almost unknown. The occurrences of it are chiefly in the arid or semiarid sections of the western United States."

• *Plecotus townsendii pallescens*

• Townsend's Big-eared Bat

Found mainly in the Lower and Upper Sonoran life-zones either in colonies or singly. This bat is a cave-dweller, but is sometimes found in attics and barns. SDNHM specimens: Barrett Dam, Escondido, Julian, Ramona, San Diego, Vallecito. Other specimens (MVZ): Agua Caliente, Banner, Blair Valley, Borrego Palm Canyon, El Monte Oaks. Krutzsch is said to have reported them at Otay Mountain (Hall and Kelson, 1959: 200).

• *Antrozous pallidus*

• Pallid Bat

Primarily a species of the Lower and Upper Sonoran life-zones. These bats are found in colonies during the spring, summer, and early fall months. Little is known of their winter behavior. They occur in various habitats (see Orr, 1954). Two races are found in the county. *A. p. pacificus* occurs along the Pacific slope side of the mountains. SDNHM specimens: Jamacha, Ramona, San Diego area, Santa Ysabel. Other specimens (MVZ): Ballena, Campo, Descanso, Fallbrook, Las Flores, Julian. *A. p. pallidus* is found in our desert region. SDNHM specimens: Jacumba. Other specimens: Agua Caliente Hot Springs (ABDSP); Vallecito (H. Grinnell, 1918: 351).

Family Molossidae (Free-tailed Bats)

• *Tadarida brasiliensis mexicana*

• Brazilian (Mexican) Free-tailed Bat

A colonial bat found in the Lower and Upper Sonoran life-zones. In the county they are most abundant on the western slopes of the mountains. Krutzsch (1955: 236) reported them from 4 mi. E Fallbrook to 2 mi. E San Pasqual, Green Valley Falls, Santee and El Monte Oaks Park. SDNHM specimens: Borrego Springs, Carrizo Creek, Dulzura, Escondido, Jacumba, Ramona, San Diego area, Sweetwater Dam. Other specimens: Descanso, Fallbrook (MVZ); San Luis Rey (USNM, Shamel,

1931: 6). Banks (1965: 23) reported a specimen from Agua Caliente in our collection that cannot be found.

- *Tadarida femorosacca*

Another colonial bat evidently found in the Lower Sonoran life-zone and into the Upper Sonoran (Krutzsch, 1944: 414). There are no specimens in the collection, but Krutzsch (1944: 201) observed them in Palm Canyon, Borrego Valley and at Sun-crest (1944: 410, 414). There are two specimens in the MVZ from Palm Canyon.

- *Tadarida macrotis*

A rare bat found in the Lower Sonoran life-zone. It is a vagrant known from three specimens collected in San Diego (SDNHM, Huey, 1932: 160; 1954: 435; and Natural History Museum of the University of San Diego, August and Dingman, 1973: 165).

- *Eumops perotis californicus*

Found in the Lower and Upper Sonoran life-zones. A permanent resident in southern California where chaparral and live oaks are found, and in more arid, rocky areas. SDNHM specimens: Bow Willow Ranger Station (Borrego Desert), Dulzura, San Diego, and Yaqui Wells. Other specimens (MVZ): Barrett Junction, Lake Hodges. H. Grinnell (1918: 372) reported them from Dos Cabezas (Borrego Desert) and Otay.

- Big Free-tailed Bat

- Western Mastiff Bat

Order Lagomorpha Family Leporidae (Rabbits and Hares)

- *Sylvilagus bachmani cinerascens*

A common cottontail rabbit found in the Upper Sonoran life-zone from sea level to the mountains, and in dense chaparral along the Pacific coast region. They do not appear to make use of burrows as does the Desert Cottontail (Orr, 1940: 173). SDNHM specimens: Ballena, Encinitas, Escondido, Lyon's Peak, San Diego area, San Felipe Valley, San Marcos. Other specimens (MVZ): Alpine, Cuyamaca Mountains, Dulzura, Grapevine Springs. Other reported localities (Nelson, 1909: 253): Laguna, Jacumba, Santa Ysabel.

- Brush Rabbit

- *Sylvilagus audubonii*

A common cottontail of the lowlands that might be mistaken for a Brush Rabbit except for its larger size. It never penetrates far into the chaparral (Orr, 1940: 126). The desert race, *S. a. arizonae*, is found in the Lower Sonoran life-zone. SDNHM specimens: La Puerta Valley, Palm Spring-Mesquite Oasis. Other specimens (MVZ): Vallecito. *S. a. sanctidiegi* is found in the Lower and Upper Sonoran life-zones along the coast from sea level to above 4000 feet in chaparral or open grassland. SDNHM specimens: Carlsbad, Grapevine Canyon, Ramona, San Diego area, Santa Ysabel, Tia Juana River Valley. Other specimens (MVZ): Cuyamaca Mountains, Dulzura, Escondido, Julian, Oak Grove, Otay Valley, San Felipe Canyon, Warner Pass, Witch Creek. Other reported localities: Jacumba, Twin Oaks, Mountain Springs, Warner Valley (Nelson, 1909: 220); San Marcos (Orr, 1940: 122).

- Desert (Audubon) Cottontail

- *Lepus californicus*

Our largest "rabbit," generally found only in open or semi-open country. Thick chaparral or forested regions are unsuitable (Orr, 1940: 80). *L. c. bennettii* is found in the Upper Sonoran life-zone along the coast to the western base of the coastal mountains from sea level to 6000 feet on Cuyamaca Mountain (J. Grinnell, 1933: 201). SDNHM specimens: Live Oak Springs, San Diego, Santa Ysabel. Other specimens: San Marcos (MVZ); Escondido, Tijuana River (Orr, 1940: 74); Dulzura, Jacumba, Jamul Creek, Laguna Mountains, Mountain Springs, Twin Oaks (Nelson, 1909: 137). The type specimen for this animal was collected in the early 1840s at

- Black-tailed Jack Rabbit (Hare)

- *Sciurus niger*

- Fox Squirrel

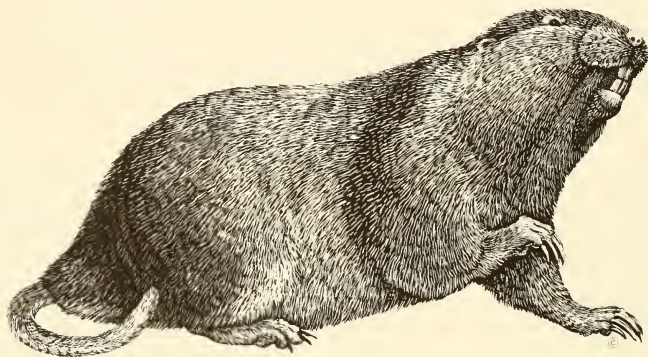
Another species introduced from the eastern United States (date unknown). This squirrel can be commonly seen in Balboa Park. SDNHM specimens: three from Balboa Park. The earliest specimen is dated 1929.

Family Geomyidae (Pocket Gophers)

- *Thomomys bottae*¹

- Southern Pocket Gopher

This is one of the most common and widespread mammals in the county. It occurs wherever vegetation grows and the soil is loose enough for them to burrow through. A fossorial gopher rarely seen above ground. There are five recognized races: *T. b. affinis*, from the Jacumba area; *T. b. boregoensis*, from Borrego Desert region; *T. b. nigricans*, found largely in the mountains; *T. b. puertae*, restricted to the La Puerta, San Felipe valleys; *T. b. sanctidiegi*, found along the coastal region.



Pocket Gopher

Family Heteromyidae (Pocket Mice)

- *Perognathus longimembris*

- Little Pocket Mouse

This is the smallest species of pocket mouse and the smallest rodent in the county. Like all pocket mice, it is nocturnal and seldom seen. Generally found in areas of fine sandy ground. There are four recognized races. *P. l. bangi*, found in the Lower Sonoran life-zone in our eastern desert region. SDNHM specimens: Borrego Desert area. *P. l. brevinasus*, found in the high Lower to low Upper Sonoran life-zones. SDNHM specimens: near Oak Grove, Ranchita, Warner Pass. *P. l. internationalis*, found in the immediate area of Jacumba, although Huey (1939: 48) stated that specimens from La Puerta, San Felipe Valley, and Warner's Pass were not typical. SDNHM specimens: Jacumba area, La Puerta Valley, San Felipe Valley, W side Blair Valley. There appears to be some intergradation of subspecies in the La Puerta Valley area (Banks, 1964: 21). *P. l. pacificus*, found in the Upper Sonoran life-zone along a narrow coastal strip running from the Tia Juana River Valley north to Los Angeles Co. SDNHM specimens: Oceanside, San Onofre, Tia Juana Valley. Also reported from mouth of Santa Margarita River (von Bloeker, 1932: 129).

¹*bottae* after Patton and Dingman, 1968: 1-13.

- *Perognathus formosus mesembrinus*

Found in the Lower Sonoran life-zone in gravelly, rocky areas in our desert. SDNHM specimens: Fish Creek Wash, Ocotillo Wells, San Felipe Canyon, Vallecito area. Other localities: La Puerta Valley (von Bloeker, 1932: 279); Borrego Palm Canyon (R. Dingman, pers. obs.).

- Long-tailed Pocket Mouse

- *Perognathus baileyi hueyi*

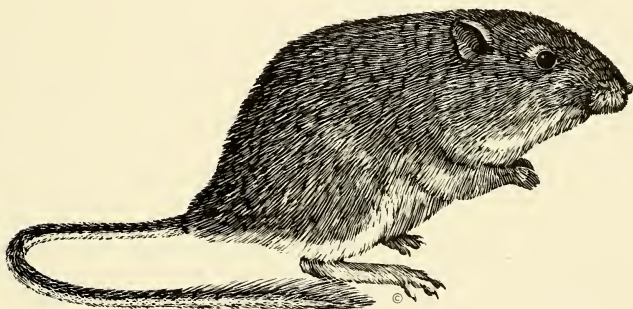
This rare pocket mouse is found in the Upper Sonoran life-zone on rocky steep slopes in our desert region. SDNHM specimens: San Felipe Narrows (only two). Other specimens: Mountain Springs, Yaqui Wells (MVZ); Borrego (CAS). Also reported from Banner and La Puerta Valley (von Bloeker, 1932: 279).

- Bailey's Pocket Mouse

- *Perognathus penicillatus angustirostris*

Found in the Lower Sonoran life-zone in open sandy desert areas. SDNHM specimens: Borrego Desert area, La Puerta Valley, San Felipe Narrows, Vallecito.

- Desert Pocket Mouse



Pocket Mouse

- *Perognathus fallax*

Found from the Lower to Upper Sonoran life-zones usually in somewhat open, sandy land with weeds. The coastal race, *P. f. fallax*, is found on the Pacific drainage side of the mountains. SDNHM specimens: Ballena, Del Mar, Dulzura, Jacumba area, Lake Hodges, Pala, San Diego area, San Marcos, Tia Juana River Valley. *P. f. pallidus* is found mainly in the Lower Sonoran life-zone on the eastern side of the mountain divide. SDNHM specimens: Earthquake Valley, Grapevine Canyon, La Puerta Valley, Ranchita, San Felipe Valley. Other records: 4 mi. W Yaqui Wells and San Felipe Narrows (Banks, 1964: 27).

- San Diego Pocket Mouse

- *Perognathus californicus fermoralis*

This pocket mouse is found chiefly in the Upper Sonoran life-zone in the coastal and montane regions on chaparral slopes. SDNHM specimens: Banner, Campo, Dehesa, Dulzura, Escondido, Pala, Rainbow, Ramona, Palomar Mountain, San Marcos, Santee, Santa Ysabel, Witch Creek. Other localities: San Felipe Valley (MVZ); La Puerta Valley (von Bloeker, 1932: 279).

- California Pocket Mouse

- *Perognathus spinatus rufescens*

Found in the Lower Sonoran life-zone in rocky rough terrain on the desert and east slopes of the coastal mountains. SDNHM specimens: Borrego Desert area, La Puerta Valley, Ranchita, San Felipe Canyon, San Felipe Narrows, Vallecito. Also reported from Mountain Springs (J. Grinnell, 1933: 156).

- Spiny Pocket Mouse

- *Dipodomys stephensi*

A rare kangaroo rat found in the Lower Sonoran life-zone in areas of sparse vegetation. It is known in the county only from an isolated area near Bonsall (Lackey, 1967). SDNHM specimens: Bonsall, 7 mi. E Oceanside, 2 mi E San Luis Rey Mission.

- Stephens' Kangaroo Rat

- *Dipodomys agilis*

This is the common kangaroo rat of the Pacific Coast of southern California. *D. a. cabezonae* is found in the Lower Sonoran life-zone on the slopes of the coastal mountains in loose soil with sparse vegetation. SDNHM specimens: Banner, Jacumba area, Oakgrove, Sunrise Highway, Warner Springs. Other specimens: Borrego Desert area, Julian, McCain Valley, Mountain Springs (MVZ); Culp Valley (ABDSP). Other localities: Grapevine Spring, La Puerta Valley, San Felipe Valley (J. Grinnell, 1922: 96). *D. a. simulans* occurs chiefly in the Upper Sonoran life-zone on the Pacific slopes of the mountains in areas of chaparral and sandy ground. SDNHM specimens: Bonsall, Cuyamaca Mountains, De Luz, Dulzura, Escondido, Jack Creek, Lake Hodges, Pala, Palomar Mountain, Pine Valley, Proctor Valley, Poway, Rincon Springs, San Diego area, San Marcos, San Pasqual Valley, Santa Ysabel, Tia Juana River Valley, Witch Creek.

- Agile Kangaroo Rat

- *Dipodomys merriami*

This small kangaroo rat is found generally in the Lower Sonoran life-zone in loose, sandy, gravelly ground with sparse vegetation. This is the common desert kangaroo rat. There are three recognized races in the county based on Lidicker's (1960) studies. *D. m. arenivagus* is a desert race. SDNHM specimens: Borrego Valley area, Bow Willow, Carrizo Creek, Mortero Canyon, Ocotillo Wells, Vallecito area. *D. m. collinus* is another desert dweller found in the western part of the desert. SDNHM specimens: Blair Valley, Earthquake Valley, La Puerta Valley, Oak Grove, San Felipe Valley. *D. m. trinidadensis* occurs in the Jacumba area (only one SDNHM specimen). Lidicker (1960: 196-198) lists specimens from Mountain Springs and Jacumba and states that this race intergrades with *D. m. arenivagus* in the Mountain Springs region. *D. m. arenivagus* and *D. m. collinus* also appear to intergrade in the San Felipe Narrows and Vallecito area. For details on intergradation see study by Lidicker (1960: 190-196).

- Merriam's Kangaroo Rat

- *Dipodomys deserti deserti*

This is our largest kangaroo rat found in the Lower Sonoran life-zone in areas of deep wind-driven sand and sparse vegetation. SDNHM specimens: Borrego Valley, Carrizo Creek, La Puerta Valley, Scissors Crossings. Other specimen (ABDSP): Vallecito.

- Desert Kangaroo Rat

Family Castoridae (Beavers)

- *Castor canadensis*

The beaver, the largest native rodent in North America, was introduced into the county in 1944. It is now found in the Upper Sweetwater River in the Cuyamaca Mountains (Cal. Fish and Game, pers. comm.) and in the San Luis Rey River below the Lake Henshaw dam (pers. obs.). There are no specimens in the collection from the county.

- Beaver

Family Cricetidae (Native Rats and Mice)

• *Reithrodontomys megalotis longicaudus*

• Western Harvest Mouse

Found mainly in the Upper Sonoran life-zone and locally in the Lower Sonoran in moist grassy areas. SDNHM specimens: from the Tia Juana River Valley north along the coast to Oceanside-Vista area to Los Flores, Ballena, Cuyamaca Mountain, Descanso, El Monte, Escondido, Grapevine Canyon, Laguna Mountain, Lake Hodges, La Puerta Valley, Pinyon Mountain Valley, Proctor Valley, Sentenac Canyon, Warner, Vallecito. Other specimens (ABDSP): Earthquake Valley, Palm Springs, Mesquite Oasis. J. Grinnell (1933: 170) considered specimens from Vallecito and Mountain Springs to be intergrades toward *R. m. megalotis*.

• *Peromyscus crinitus stephensi*

• Canyon Mouse

This member of the White-footed mouse group is found in the Lower Sonoran life-zone in rough rocky areas in our desert region. SDNHM specimens: Borrego Valley, Bow Willow Campground, Fish Creek Wash, Mortero Canyon, Ocotillo Wells area, Pinyon Mountain, Seventeen Palms Oasis. Also reported from San Felipe Valley (Osgood, 1909: 234). This mouse is similar to the Cactus Mouse (*P. eremicus*) and is sometimes difficult even for experienced persons to identify.

• *Peromyscus californicus insignis*

• California Mouse

This is the largest of the White-footed mice in the county. It is commonly found in the Upper Sonoran life-zone in chaparral covered slopes. SDNHM specimens: from the San Diego area north along the coast to Los Flores Mission, Dehesa, Dulzura, Escondido, Poway, Rainbow, Santa Ysabel, Scissors Crossing, Witch Creek. Other localities: Campo, Jacumba, Jamul Creek, Mountain Springs, Santa Ysabel, Twin Oaks (Osgood, 1909: 238); 6 mi. N Foster, Julian, La Puerta Valley, San Felipe Valley, Warner Pass (Grinnell and Orr, 1934: 220).

• *Peromyscus eremicus*

• Cactus Mouse

This is the second commonest White-footed mouse in the county. The desert race, *P. e. eremicus*, is found in the Lower Sonoran life-zone in arid lowlands on sandy desert floors. It is the most abundant rodent in our desert and SDNHM specimens are from various areas in the Borrego Desert (see Banks, 1964: 43-46). *P. e. fraterculus* is the coastal race found in the Upper Sonoran life-zone west of the coastal mountains in areas of sparse, shrubby vegetation. SDNHM specimens: Dehesa, Dulzura, Escondido, Pala, Poway, San Diego area, San Marcos, San Pasqual, Tia Juana River Valley. Other localities: Chihuahuah Mountains, Jamul Creek, Jacumba, Mountain Springs, Santa Ysabel, Twin Oaks (Osgood, 1909: 244); Campo (J. Grinnell, 1933: 173). The races seem to intergrade in the Mountain Springs and Jacumba areas (Grinnell, op. cit.).



Cactus Mouse

• *Peromyscus maniculatus*

This is the most abundant, widespread mammal in California. In the county it is found in nearly all the habitats from the Lower Sonoran to the Transition zones. Two subspecies occur. *P. m. gambelii*, with over 250 specimens in our collection, ranges from the extreme western edge of the desert to the coastal area. *P. m. sonoriensis*, the desert race, is found in the Lower Sonoran life-zone. SDNHM specimens: Borrego Valley, Jacumba, La Puerta Valley, San Felipe Valley, Warner's Ranch, Vallecito. The two races intergrade in the mountains and western desert area (see Banks, 1964: 46, and J. Grinnell, 1933: 174).

• *Peromyscus boylii rowleyi*

Common locally in the Upper Sonoran life-zone, on wooded or brushy slopes in arid or semi-arid regions. SDNHM specimens: Ballena, Cuyamaca Mountains, Dehesa, Doane Valley, El Monte, Escondido, Jamul Rancho, Laguna Mountains, Margarita Peak, Pinyon Mountain Valley, Rainbow, Santa Ysabel, Sentenac Canyon, Witch Creek. Other localities (Osgood, 1909: 146-147): Chihuahua Mountains, Jacumba, Julian, Mountain Springs, Oak Grove, Smith (= Palomar) Mountain.

• *Peromyscus truei martirensis*

This mouse of the high country is found in the Upper Sonoran to the Transition life-zones on dry slopes covered with scrub oak type vegetation. Not common. SDNHM specimens: Culp Valley, Mountain Springs, Monument Peak in the Laguna Mountains.

• *Onychomys torridus*

This mouse resembles a short-tailed *Peromyscus* and does not seem to be restricted to any one habitat. It is not as common as the white-footed group. Two races are found in the county. *O. t. pulcher* is found in the Lower Sonoran life-zone in desert areas of shrubby vegetation. SDNHM specimens: Blair Valley, Grapevine Canyon, Mason Valley, Mountain Springs. Other specimens: Earthquake Valley (ABDSP); Scissors Crossing (MVZ). *O. t. ramona* is found in the Lower and Upper Sonoran life-zones on the Pacific slopes. SDNHM specimens: Carlsbad, Culp Valley, Dulzura, San Diego, San Pasqual Valley, Tia Juana River Valley. Other localities (Hollister, 1919: 469): Jacumba, La Puerta Valley, Warner Pass. Banks (1964: 50) states that the two races intergrade and that identification is difficult.

• *Neotoma albigula venusta*

This native rat is found in the Lower Sonoran life-zone and reaches its western range limits in our eastern county. Not common. SDNHM specimens: Borrego Springs, Carrizo Creek. Banks (1964: 54) collected one near Ocotillo Wells.

• *Neotoma lepida*

The common name for this mammal is somewhat misleading since it is found in the mountains and along the coast as well as in the desert. There are three recognized races in the county. *N. l. gilva* is found in the Lower and Upper Sonoran life-zones usually in rocky or shrubby vegetative arid plains. There is only one specimen in the collection from Mountain Springs. Other specimens (MVZ): Jacumba, Manzanita. Goldman (1932: 64) states that *gilva* is an intergrading form connecting *lepida* and *intermedia*. A common coastal wood rat, *intermedia*, occurs mainly in the Upper Sonoran life-zone on the western slopes of the mountains in chaparral areas. SDNHM specimens: Bonsall, Mission San Luis Rey north along the coast to San Onofre Mountain, Fortuna Mountain, Mission Gorge, Murphy Canyon, Murray Dam, Proctor Valley, San Diego area, Santa Ysabel, mouth of the Tia Juana River, Witch Creek. Other specimens (MVZ): Dulzura, Jacumba, Julian. Also reported from Jamul and Poway (Goldman, 1910: 44). *N. l. lepida* is a desert race

• Deer Mouse

• Brush Mouse

• Piñon Mouse

• Southern Grasshopper Mouse

• White-throated Woodrat

• (White-footed) Desert Woodrat

restricted to rocky and (or) agave covered areas in the Lower Sonoran life-zone. SDNHM specimens: various localities within Anza Borrego Desert State Park (see Banks, 1964: 56), Borrego Springs, near Ocotillo Wells.

• *Neotoma fuscipes macrotis*

This large woodrat is found chiefly in the Upper Sonoran life-zone in heavy chaparral areas usually near water. It occurs from the mountains to the coast. SDNHM specimens: Tia Juana River Valley, San Diego area north along the coast to San Clemente, Grapevine Canyon, Poway, near Ranchita, San Marcos, Santa Ysabel, Witch Creek. Other specimens (MVZ): Campo, Canebrake Canyon, Oakgrove, Warner Pass. Hooper (1938: 232) examined specimens from Escondido and Julian.

• Dusky-footed Woodrat

• *Microtus californicus sanctidiegi*

This medium size mouse with coarse brown fur, short ears, and a short tail is found in the Lower Sonoran to Transition life-zones. It is common near water in grassy or marshy areas. SDNHM specimens: San Diego area north along the coast to Oceanside, inland from Ballena, Palomar Mountain, Escondido, Julian, Ramona, Santa Ysabel, Witch Creek. Specimens from Sentenac Canyon may prove to be an undescribed race (Banks, 1964: 58). Other specimens (MVZ): Dulzura, Jacumba, La Puerta Valley, Mountain Springs, Vallecito. Also reported from the Cuyamaca Mountains and Warner Pass (Kellogg, 1918: 31).

• California Vole

Family Muridae (Old World Rats and Mice)

• *Rattus rattus*

This Old World rat was introduced in the New World as early as 1544 and has been found in San Diego since 1856 (Baird, 1857: 440). It was not considered numerous in 1921 (Stephens, 1921: 46) but is now commonly found around areas of human habitation. SDNHM specimens: San Diego area.

• Black (Roof) Rat

• *Rattus norvegicus*

Another introduced Old World rat that first appeared in 1775. Before 1851 it was not found on the Pacific coast, but was abundant in 1856, when specimens were taken in San Diego (Baird, 1857: 439). This rat is also found around human habitation and Stephens (1921: 45) reported them as "thoroughly established. Abundant in towns and becoming common in the country." There are no specimens in the collection from the county. The Black Rat seems to have replaced it (San Diego County Department of Public Health, pers. comm.).

• Norway (Brown) Rat

• *Mus musculus*

This Old World animal probably came to the New World with the earliest explorers. Found in both cultivated and uncultivated areas, it was reported from San Diego as early as 1856 (Baird, 1857: 444). Now very common. SDNHM specimens: El Cajon, Fortuna Mountain, Oceanside, San Diego area.

• House Mouse

Family Capromyidae (Coypus)

• *Myocaster coypus*

This South American rodent, first introduced in California in 1942, near Oakdale, Stanislaus Co. (Howard, 1953: 513), has since become feral. It inhabits areas around water much like the muskrat (*Ondatra*) and has been reported wild in San Diego Co. since 1948 (Ingles, 1965: 309). There is a partial skull in the collection which was found in Mission Valley. According to the California State Fish and Game Department (pers. comm.) there are none in the area at this time.

• Nutria or Coypu

Order Carnivora
Family Canidae (Dogs and Allies)

• *Canis latrans clepticus*

• Coyote

This native dog is commonly found in the Upper and Lower Sonoran life-zones up into the Transition zone inhabiting open valley floors and forested areas with clearings. This race is said to be a connecting form between *ochropus* on the north and *peninsulae* on the south (Jackson, 1951: 295). It also intergrades with *mearnsi* on the east and it is difficult to properly ascribe specimens to race. SDNHM specimens: Borrego Springs, La Puerta Valley, Los Flores Mission, Los Penasquitos Canyon, Poway, San Diego area, Warner Springs, Vallecito. Other reported localities: Jacumba, Julian, San Marcos (Jackson, 1951: 295); San Felipe Valley, San Onofre, Tia Juana River (as *C. l. ochropus*, Grinnell, et al., 1937: 501).

• *Vulpes macrotis arsipus*

• Kit Fox

This uncommon small fox is found in level desert areas of the Lower Sonoran life-zone where the substrate is sandy. There is only one specimen in the collection, from La Puerta Valley. Stephens (1921: 50) reported trapping them at Borrego Springs. The Anza Borrego Desert State Park Rangers report seeing them throughout the park (M. Getty, pers. comm.).

• *Vulpes macrotis macrotis*

• Long-eared Kit Fox — EXTINCT

This race of the kit fox occurred along the coast in the Lower Sonoran life-zone and is "rather certainly now extinct" (Allen, 1942: 197). One specimen (skin only) in the collection was taken one mile north of Rancho Santa Fe in 1931. Its identity was confirmed by R. S. Hoffman (1976, Visiting Fellow, National Museum of Natural History).

• *Urocyon cinereoargenteus californicus*

• Gray Fox

A common fox found chiefly in the Upper Sonoran life-zone and down into the Lower Sonoran in chaparral areas. It feeds primarily on ground squirrels and other small mammals. SDNHM specimens: Anza Borrego Desert State Park, Ballena, Escondido, Los Flores Mission, Potrero Grade, Ramona, San Diego area, San Marcos, Santa Ysabel, Witch Creek. Other specimens (MVZ): Campo, Cranebrake Canyon, La Puerta Valley, Pine Mountain.

Family Ursidae (Bears)

• *Ursus americanus*

• Black Bear

This species, which normally occurs from Ventura Co. north, was introduced to the Campo area and the Cuyamaca Mountains between 1917-1919 by a group of servicemen (Abbott, 1935: 150). Apparently they soon died out. The collection contains a single skull of a female taken in 1934 at Potrero, probably the last of this group of animals. In recent years the black bear has been sighted in Camp Pendleton (1975) and Lake Henshaw and the Palomar Mountain area (1976), and an adult male was shot in June 1976 near Buckman Springs, 5 miles south of Pine Valley. These bears are thought to be coming in from the San Bernardino Mountains to the north.

• *Ursus magister*

• Southern California Grizzly — EXTINCT

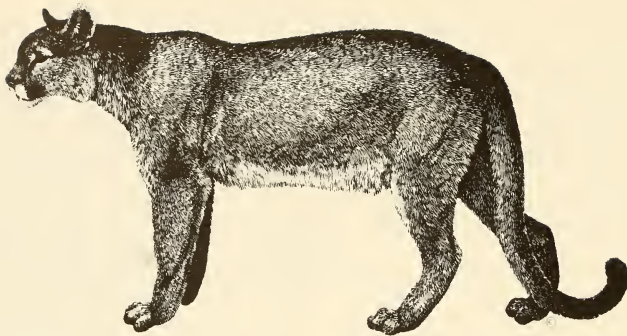
This, the largest grizzly bear known outside of Alaska, was "rather common in the mountains" nearly one hundred years ago (Stephens, 1921: 51). There are no specimens in the collection from the county, but two taken at San Onofre and Trabuco canyons are in the USNM (nos. 156594, 160155). The last individual was shot in 1908 (Storer and Tevis, 1955: 28). Other recorded sites: Palomar Mountain (Bell, 1930: 108); Pine Valley (Abbott, 1935: 151); Santa Rosa Mountains (J. Grinnell, 1933: 98).

Family Procyonidae (Raccoons and Allies)

- *Bassariscus astutus octavus* • Ringtail (Ring-tailed Cat)
Found on the Pacific slope in the Upper Sonoran life-zone in brush and chaparral, along with *Peromyscus* and *Neotoma*, its main food. A nocturnal animal not commonly seen. SDNHM specimens: Borrego area on the Montezuma Grade, Live Oak Springs, San Diego, San Luis Rey River near Escondido, Sentenac Canyon. Other localities: foot of Palomar Mountain (Stephens, 1921: 51); Jacumba (J. Grinnell, 1933: 100).
- *Procyon lotor psora* • Raccoon
Found generally in the Upper Sonoran life-zone along streams, in marshes and near lakes. Seldom seen due to its nocturnal habits. It is probably the most omnivorous native carnivore in the county (Ingles, 1965: 357). SDNHM specimens: Los Flores Mission, San Diego area, Santa Ysabel. Other specimens (MVZ): Cuyamaca Mountains, Julian. Also reported from Palomar Mountain (R. Dingman, pers. obs.).

Family Mustelidae (Weasels and Allies)

- *Mustela frenata latirostris* • Long-tailed Weasel
Found in all habitats near water, from the Lower Sonoran through the Upper Sonoran life-zones. Frequently found in area of old gopher (*Thomomys*) and ground squirrel (*Spermophilus*) burrows, which it uses for its nest area. Active both day and night, feeding mostly on small rodents. SDNHM specimens: Cardiff, Escondido, Lakeside, Jamacha, Mount Woodson, San Diego area, San Marcos, Santee, Tia Juana River bottom. Other reported localities (Hall, 1951: 327): Ballena, El Cajon, Julian, Twin Oaks, Witch Creek.
- *Taxidea taxus* • Badger
Not commonly seen, the badger is most active during the late afternoon hours. There are two races in the county. *T. t. berlandieri* is found on the eastern side of the coastal mountains. SDNHM specimens: La Puerta Valley. *T. t. neglecta* is found west of the mountains and appears to have no zonal restrictions (J. Grinnell, 1933: 108). It is found in levelish, open, unforested areas. SDNHM specimens: Lakeside, Escondido, Ramona, San Marcos, Sweetwater Reservoir, Witch Creek. Other reported sites are near El Cajon (Grinnell, et. al., 1937: 361).
- *Spilogale gracilis microrhina* • Western Spotted Skunk
This uncommon small skunk is found in the Lower and Upper Sonoran life-zones usually in dry rocky or brushy hillsides. SDNHM specimens: Jamul, Ramona, San Diego area, Santa Ysabel, Witch Creek. Other localities: Julian, Escondido, Cuyamaca Mountains (Hall, 1926: 53); La Puerta, Dulzura (Hall and Kelson, 1952: 355).
- *Mephitis mephitis holzneri* • Striped Skunk
The common skunk of the county is found chiefly in the Upper Sonoran life-zone and into the Lower Sonoran. Usually it occurs in brushy woodland and chaparral hillsides, but it has become adapted to city living where it acts as a scavenger. SDNHM specimens: Lake Hodges, Otay, San Diego area, San Onofre, Santa Ysabel. Other reported localities (Grinnell, et. al., 1937: 317): Campo, Cuyamaca Mountain, Warner Pass, Witch Creek, Vallecito.



Mountain Lion

Family Felidae (Cats)

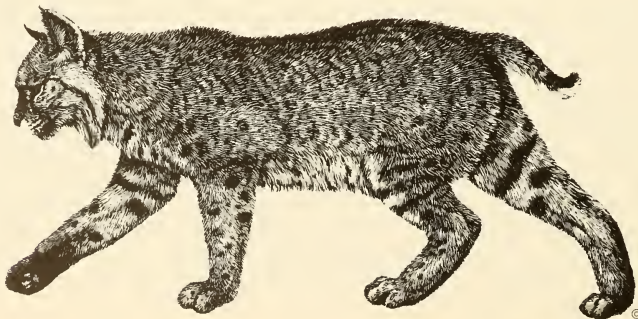
• *Felis concolor californicus*

Found in the Upper Sonoran and Transition life-zones mainly in forested or chaparral-covered mountains where deer (*Odocoileus*), its chief food, are present. SDNHM specimens: Buckman Springs, Campo, Mesa Grande, Pine Valley, Smith (= Palomar) Mountain. Other specimens (MVZ): south base Los Pinos Mountain, Laguna Indian Reservation, Wynola. Also reported from the Cuyamaca Mountains (J. Grinnell, 1933: 114). According to Stephens (1921: 49), "Still occasionally found in San Diego County. I have never seen one alive out of a cage." At the present time, the California State Fish and Game Department estimates a county population of approximately 25.

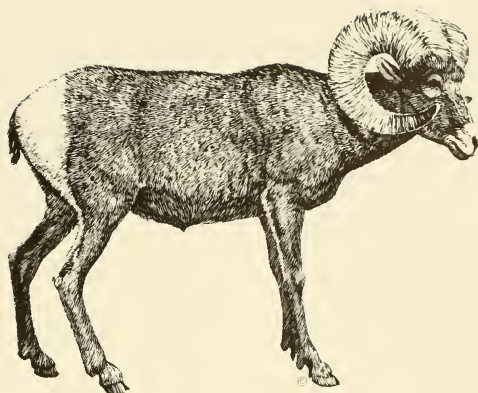
• *Lynx rufus*

The bobcat is found throughout the county from the desert to the coast. *L. r. baileyi* is found in the Lower Sonoran life-zone east of our mountains in brushy and rocky areas usually near springs. Specimens: Sentenac Canyon (SDNHM), Vallecito (MVZ). Paul Johnson, ranger at Anza Borrego Desert State Park, reported seeing them along the western region of the park. *L. r. californicus* is found west of the desert region most abundantly in the foothill chaparral. SDNHM specimens: Alpine, Cuyamaca State Park, Del Mar, Flynn Springs, Los Flores Mission, Otay, Paradise Valley, Pine Valley, Ramona, San Diego area, San Marcos, Santa Ysabel, Volcan Mountain, Witch Creek. Other specimens (MVZ): Campo, Foster (near Lakeside), Pine Mountain.

• Bobcat (Wildcat)



Bobcat



Bighorn

Order Artiodactyla

Family Cervidae (Deer and Allies)

- *Cervus elaphus* • Wapiti or American Elk
- Introduced. Twelve elk of mixed Tule-Rocky Mountain stock were liberated in the Laguna Mountain area in 1919 (Dasmann, 1958: 21). They are no longer found in the county, the last report listed seven adults and one young in 1922 (Reddington, 1922: 191).

- *Odocoileus hemionus fuliginata* • Southern Mule Deer
- Found in the Lower Sonoran to Transition life-zones, in chaparral to open forest areas. SDNHM specimens: Alpine, Descanso, Cuyamaca Mountains, Grapevine Spring, Laguna Mountains, and Smith (= Palomar) Mountain. Other specimens (MVZ): Barona Ranch, De Luz, San Mateo Valley: Colb Valley (Cowan, 1933: 327). According to George McCleary, Camp Pendleton Game Warden, there are approximately 3000 to 4000 mule deer on the base. Also reported at Torrey Pines State Reserve and Miramar NAS (R. Dingman, pers. obs.).

Family Antilocapridae (Pronghorns)

- *Antilocapra americana* • Pronghorn (American Antelope) — EXTINCT
- This animal, unique to North America, was the first species of mammal to be recorded in California at San Diego Bay (Ferre, 1879: 304). Stephens considered them practically extinct in 1921, although he saw four at Carrizo Creek "many years ago" (1921: 44). The last report was of a band of five near Campo in 1922 (Nelson, 1925: 27). There are no specimens from the county.

Family Bovidae (Cattle, Sheep and Allies)

- *Ovis canadensis* • Mountain Sheep (Bighorn)
- This native sheep, also known as the Desert Bighorn, is found in the Lower and Upper Sonoran life-zones on open, rough, barren slopes of our desert region. According to Paul Johnson, Park Ranger at Anza Borrego Desert State Park, the present population numbers 300-400 and has remained constant for the past few years. SDNHM specimens: Borrego area, Carrizo Gorge, Split Mountain, Vallecito, and southeast county. These animals are probably referable to *O. c. cremnobates*. Specimens at MVZ from Julian have been referred to as *nelsoni*, although Cowan (1940: 567) considers them intermediate between the two.

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